AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for the physical vapor deposition (PVD) of dielectric material onto a substrate, said method comprising:

(a) forming an energized monochromatic ion beam;

(b) converting said ion beam into an energized monochromatic beam of neutrals <u>by passing the ion beam through a charge transfer chamber containing a volume of neutrally charged gas atoms or molecules, wherein the neutrally charged gas atoms or molecules are slower moving relative to said ion beam, such that said relatively fast moving positively charged ions collide with said relatively slow moving neutral gas atoms or molecules inside said charge transfer chamber such that said collision events cause said positively charged ions to acquire an electron from said slow moving neutral gas atoms or molecules</u>;

(c) directing said beam of neutrals toward a sputtering target;

(d) exposing said target to bombardment by said beam of neutrals;

(e) sputtering particles from said target;

(f) forming a cloud of said sputtered particles proximate to a substrate, wherein the cloud is formed by an increased density of thermalized particles; and

(g) depositing said sputtered particles onto said substrate.

2. (Original) The method as recited in claim 1 wherein said target comprises low-k dielectric material.

3. (Original) The method as recited in claim 2 wherein said low-k dielectric material is organic.

4. (Original) The method as recited in claim 2 wherein said low-k dielectric material is inorganic.

5. (Original) The method as recited in claim 1 wherein said low-k dielectric material has a dielectric constant of about 1.3 to 3.7.

6. (Currently amended) A system for the physical vapor deposition (PVD) of dielectric material onto a substrate, said system comprising:

(a) a sputtering target;

(b) a low energy, large aperture ion source of energized monochromatic ions;

(c) an ion optics system for equalizing, shaping, and directing said ions into an ion beam;

(d) a charge transfer system for neutralization of said ion beam into a beam of neutrals comprising a charge transfer chamber having a volume of slower moving neutrally charged gas atoms or molecules, wherein as the ion beam passes through the charge transfer chamber, said relatively fast moving positively charged ions collide with said relatively slow moving neutral gas atoms or molecules such that during said collision events said fast moving positively charged ions acquire an electron from said slow moving neutral gas atoms or molecules;

(e) means for directing said beam of neutrals toward the target, said beam of neutrals bombarding said target and causing said target to emit sputtered particles;

(f) means for forming a thermalized cloud of said sputtered particles proximate said substrate; and

(g) means for depositing said cloud of said sputtered particles onto said substrate.

7. (Previously presented)The system as recited in claim 6, wherein said target comprises low-k dielectric material.

8. (Previously presented)The system as recited in claim 7 wherein said low-k dielectric material is organic.

9. (Previously presented)The system as recited in claim 7 wherein said low-k dielectric material is inorganic.

10. (Previously presented)The method as recited in claim 1 wherein the ion beam is converted into an energized monochromatic beam of neutrals by passing the ion beam through a charge transfer chamber containing a volume of slower moving neutrally charged gas atoms or molecules, wherein the neutrally charged gas atoms or molecules are slower moving relative to said ion beam.

11. (Previously presented) The method as recited in claim 10 wherein the energized monochromatic ion beam is formed having an ion energy in the range of 100-400 eV.

12. (Previously presented)The method as recited in claim 1 wherein the energized ion beam is converted into the energized monochromatic beam of neutrals by directing said ion beam through a charge transfer chamber containing a volume of relatively slower moving neutrally charged Ar gas.

13. Cancelled

14. (Previously presented)The method as recited in claim 1 wherein the cloud is formed by increasing the number of collisions between gas molecules and sputtered particles to decrease the directional momentum of said sputtered particles as they propagate toward the substrate.

15. (Currently amended) A method for the physical vapor deposition (PVD) of dielectric material onto a substrate, said method comprising:

forming an energized monochromatic ion beam;

converting said ion beam into an energized monochromatic beam of neutrals by directing said ion beam through a charge transfer chamber containing a volume of relatively

slower moving neutrally charged Ar gas molecules, wherein the neutrally charged Ar gas molecules are slower moving relative to said ion beam such that said relatively fast moving positively charged ions collide with said relatively slow moving neutral Ar gas molecules contained inside said charge transfer chamber so that during said collision events, said fast moving positively charged ions acquire an electron from said slow moving Ar gas molecules;

directing said beam of neutrals toward a sputtering target;

exposing said target to bombardment by said beam of neutrals;

sputtering particles from said target;

forming a cloud of thermalized sputtered particles proximate to a substrate, wherein the cloud is formed by increasing the number of collisions between gas molecules and sputtered particles to decrease the directional momentum of said sputtered particles as they propagate toward the substrate; and

depositing said sputtered particles onto said substrate.

16. (Previously presented)The method as recited in claim 15 wherein the energized monochromatic ion beam is formed having an ion energy in the range of 100-400 eV.

17. (Previously presented)The method as recited in claim 15 wherein said target comprises a material selected from the group consisting of fluorsilicate glasses (FSG), organosilicate glasses (OSG), porous oxides with carbon component, porous silica, and polyaromatic polymers.

18. (Previously presented)The method as recited in claim 15 wherein during the step of exposing said target to bombardment by said beam of neutrals, the surface of the target is free of target surface charge compensation.

19. (Previously presented)The method as recited in claim 1 wherein during the step of exposing said target to bombardment by said beam of neutrals, the surface of the target is free of target surface charge compensation.

20. (Previously presented)The system as recited in claim 6, wherein means for directing the beam of neutrals directs the beam toward a target having a surface free of target surface charge compensation.